

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Disorder in DNA-Linked Gold Nanoparticle Assemblies NOLAN HARRIS, CHING-HWA KIANG, Physics & Astronomy, Rice University — We report experimental observations of the effects of disorder on the phase behavior of DNA-linked nanoparticle networks. Variation in DNA linker lengths results in different melting temperatures, and hence stabilities, of DNA-linked nanoparticle assemblies. We discovered an unusual trend in the melting temperatures, resulting from the introduction of linker DNA which produced unequal DNA duplex lengths between particles. Comparison with DNA thermodynamics proves that such an anomaly does not exist for free DNA duplex melting, and suggests the influence of disorder on the collective behavior of DNA-linked nanoparticle assemblies. This disorder, brought about by the presence of two duplexes of different length and energy between each particle pair lowers the overall stability of the network formed.

1. C.-H. Kiang, “Phase Transition of DNA-Linked Gold Nanoparticles,” *Physica A* **321** (2003) 164–169.
2. N. C. Harris and C. H. Kiang, “Disorder in DNA-Linked Gold Nanoparticle Assemblies,” *submitted* (2004).

Ching-Hwa Kiang
Physics & Astronomy, Rice University

Date submitted: 01 Dec 2004

Electronic form version 1.4